

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

**Claims 1-6 (canceled).**

**Claim 7** (previously amended): A sensor for measuring water content of bulk materials, the sensor being powered by a direct current excitation, the sensor comprising:

an oscillator to provide a square wave voltage signal;

a transmission line having an input and an output, the transmission line input being coupled to receive the square wave voltage signal, the transmission line output being coupled to a phase detector;

the phase detector detecting a phase difference between the square wave voltage signal provided by the oscillator and the signal provided to the transmission line, the phase detector providing an output signal indicative of the phase difference caused by changes in moisture content of a medium surrounding the transmission line wherein the phase detector comprises:

a semiconductor circuit having first and second inputs and an output, the output of the semiconductor circuit being indicative of a logical exclusive OR function of signals applied to the first and second inputs of the semiconductor circuit, the first input of the semiconductor circuit being coupled to the oscillator to receive the square wave voltage signal and the second input of the semiconductor circuit being coupled to the transmission line;

a low pass filter providing a direct current output proportional to moisture content.

**Claims 8-10** (canceled).

**Claim 11** (currently amended) A sensor for measuring water content of bulk materials according to claim 7 ~~The method of claim 9~~ wherein a time domain reflectometry wave form is used to measure the phase difference.

**Claim 12** (currently amended) A sensor for measuring water content of bulk materials according to claim 7 ~~The method of claim 9~~ wherein a frequency domain wave form is used to measure the phase difference.

**Claim 13** (canceled).

**Claim 14** (currently amended) A sensor for measuring water content of bulk materials according to claim 7 ~~The method of claim 9~~, further comprising an insulator over comprising: insulating the transmission line from the bulk material being measured.

**Claim 15** (canceled).

**Claim 16 (new)** A sensor for measuring water content of bulk materials according to claim 7 wherein the low pass filter comprises a resistor and a capacitor connected to the output of the semiconductor circuit producing a DC voltage proportional to the phase difference of the signals provided to the first and second inputs.

**Claim 17 (new)** A sensor for measuring water content of bulk materials according to claim 7 wherein the semiconductor circuit comprises electrical traces on an elongated printed circuit board,

**Claim 18 (new)** A sensor for measuring water content of bulk materials according to claim 7 wherein the semiconductor circuit comprises electrical traces on an elongated printed circuit board, and wherein the electrical traces on the elongated printed circuit board sense a dielectric constant of the bulk materials based on the measured phase difference.